Saskatchewan Agriculture, Food and Rural Revitalization

ADF

AGRICULTURE DEVELOPMENT FUND

FINAL REPORT

20020257

APPLIED RESEARCH AND INDUSTRY DEVELOPMENT

Funded by: The Agriculture Development Fund

March, 2004

Prepared by: South East Research Farm

104-06864/

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2003 Weather Summary

Month	Daily Average (°C)			Precipitation (mm)	GGD	Cumulative GGD
	Minimum	Average	Maximum			
April	-0.8	5.0	11.5	18.8	-	-
May	4.7	11.7	18.2	50.2	212	212
June	9.4	16.3	22.7	34.9	338	550
July	12.1	19.4	26.4	27.2	446	996
August	13.4	20.9	28.9	35.5	492	1489
September	4.8	11.9	19.2	12.9	212	1700
October	0.2	6.8	14.1	16.0	119	1819
Total				195.5		

GGD – growing degree days is an energy term obtained by subtracting the value five from the average daily temperature. If the average temperature is below 5°C the growing degree day value for that day is zero.

The threshold value of 5°C is derived from the growth habits of cereal and forage crops, which show little growth or development when average temperatures are below 5°C. Daily GGD values are added together from the beginning of the season, providing an indication of the energy available for plant growth. Growing degree day totals are used for comparing the progress of a growing season to the long-term average and are useful for estimating crop development stages and maturity dates.

Source: Weather Forcasting and Terminology
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex2984?opendocument

2003 Field Tours

The South East Research Farm (SERF) hosts a number of field tours during the year. The tours provide a forum for producers to collect information regarding new technologies as well as ask questions about existing concerns or technologies. This season there were two important events hosted by SERF.

Pulse Tour 2003 – July 23

Good weather brought out approximately 150 people to Pulse Tour 2003 held at the South East Research Farm Inc. main site. The tour this year was co-hosted with the Saskatchewan Pulse Growers. Many companies sponsored this event and helped make it a great success. Attendants included producers, researchers, and industry representatives. They were provided information on:

- dry bean production
- regional pea and bean variety trials
- fertility tests involving wheat, barley, peas, canola, and winter wheat
- swine manure injection demonstration
- canola variety demonstrations
- forage quality work
- fibre flax opportunities
- cereal variety tests involving winter wheat and barley
- as well as industry updates on pulses and insects

Many excellent questions were fielded and answered during the annual field tour. The day wrapped up about mid afternoon with a trip to the refreshment tent for most to cap off another exceptional field tour.

Pesticide Free Production (PFP™) Tour at Fairlight – August 6

This year was the first year for the South East Research Farm Inc. to manage a quarter of land at Fairlight owned by local ADD Board # 5. This year's research project examines the economics of Pesticide Free Production (PFP™) in flax. PFP™ allows producers to grow a non-GMO crop and apply a non-residual pesticide prior to emergence, but no pesticides may be applied from the time of emergence. PFP™ allows the use of fertilizer to be applied at time of seeding. This is a very flexible system incorporating organic and traditional cropping methods together. The purpose of the field tour, attended by a dozen producers, was to make them aware of possible opportunities available with PFP™ production.

Financial support for this project has been provided by the Canadian Adaptation and Rural Development Fund in Saskatchewan (CARDS). Funding for the CARDS program is provided by Agriculture and Agri-Food Canada. Pesticide Free Production and PFP are registered trademarks of the University of Manitoba. For more information about Pesticide Free Production please visit www.pfpcanada.com on the Internet.

Winter Wheat Production following Annual Forage Production

Summary

The purpose of this study was to evaluate winter wheat yield potential in the year following annual forage production. Winter wheat was seeded onto the early seeding date of "Cool Season/Warm Season Annual Forage Trial" from 2002. The cool season crops showed higher wheat yields compared to warm season crops with a few exceptions. Later maturing warm season crops had lower yields versus earlier maturing warm season crops.

Background and Objectives of Study

Winter wheat has been generating more interest as an addition into crop rotations. Winter wheat allows producers to spread out their workload, easing pressure during peak workload periods. Annual forage crops are generally finished production late in summer or early fall, making winter wheat production a good option for producers. Winter wheat should be seeded around September 5th for best results. The land from the early seeding date from a 2002 warm season/cool season trial was available to observe the effects different annual forages would have on subsequent winter wheat seed yield at the request of some area producers.

Study Description

This trial was completed on previous plots of annual forages at the main farm site in Redvers. The existing trial was a randomized complete block design with four replicates and 12 treatments. The winter wheat variety CDC Clair was chosen and seeded perpendicular to previous plots. Phosphate was applied with seed at a rate of 20 lbs. per acre. Four of the forage crops were cool season crops, they were: fababeans, oats, barley, and triticale. The remaining eight crops are warm season and can further be divided into early and late maturing. The late maturing crops were Golden German Millet, Strain R Millet, White Wonder, and Megagreen. Prosso Millet, Crown Millet, and Siberian Red Millet make up the early maturing warm seasoned forages. Pearl Millet was removed from analysis due to poor emergence during the spring and summer of 2002. In-crop weed control was provided using 2,4-D at a rate of 0.38 L/ac. Seed yield of the winter wheat was the only parameter recorded.

Results and Conclusions

Winter wheat sown on cool season forage crops generally show higher yields compared to warm season forage crops. Fatima Fababean, Ranger barley and Sandrow triticale showed the highest yields, these are consistent with expectations. These crops finish growing earlier in the growing season and as a result are not utilizing soil moisture later in the season. This moisture is then available for the winter wheat to begin growth at

seeding in the fall. It was surprising to see that the oats were not a part of this group. Yields from the earlier maturing millets were generally higher compared to the later maturing warm season forages. Yield reductions would be expected from the later maturing crops because they are removing soil moisture later in the season, making it unavailable to the winter wheat.

Fatima Fababeans had small forage yields in the 2002 trial and would not be the best choice for an annual forage crop, though it showed strong winter wheat yields this year. The benefit of growing warm season crops is for fall grazing and swath grazing; these practices do not fit with winter wheat production. The traditional cool season crops show the best potential for planting winter wheat following annual forage production.

Table 1. Mean seed yield of CDC Clair following annual forage production.

Annual Forage Crop	Season Type	Yield (bu/ac)*
Fatima Fababean	Cool	40.0 a[1]
Ranger Barley	Cool	37.7 ab
Sandrow Triticale	Cool	35.0 abc
AC Prairie Gold Proso Millet	Warm	33.0 bcd
Siberian RedFoxtail Millet	Warm	29.4 cde
Golden German Millet	Warm	28.6 cde
AC Pinnacle Oats	Cool	26.0 e
Strain R German Millet	Warm	26.0 e
White Wonder Foxtail Millet	Warm	25.7 e
Crown Millet	Warm	23.7 e
Megagreen Sorghum-Sudangrass	Warm	22.7 e
LSD ($p<0.05$)		6.7

*moisture adjusted to 14.5%

[1]values followed by different letters are significantly different @ $p<.05$.

Indication for Further Development

Based on results from this site in 2003, cool season forages grown previous to winter wheat provide a greater opportunity for increased wheat yields, compared to seeding onto warm season forage crop residue. More work is being completed examining the potential for warm season forage swath grazing. Other interactions could be studied between the winter wheat and forage production, but are unlikely to occur here in Redvers.

Winter Cereals Variety Trial

Summary

This trial was intended to promote the advantages of including winter cereals in crop rotations in the south east. Winter cereals are becoming popular due to benefits like field workload distribution and high yield potential compared to spring wheat (Linnell, 2003). Attendants of the annual field tour had the opportunity to learn some of the agronomy suggested for growing successful winter cereals. Thirteen different varieties were showcased, nine of which were developed in Canada and the remaining from Montana. Yields this season were lower than expected. This could have been a result of seeding at a lower than suggested seeding rate. Suggested seeding rates are 120 lbs. per acre and a seeding rate of 100 lbs. per acre were used. Producers who attended the annual field day were told the importance of utilizing proper fertility, especially using phosphate fertilizer at time of seeding. Seeding depth is also very important for winter cereals; they should not be seeded deeper than one inch into the soil. Shallow seeding depths allow the seed to take advantage of soil moisture provided from fall rains (Fowler, 2002).

Background and Objectives of Study

This project was initiated to promote winter cereal varieties to producers in the area as viable additions to their crop rotations. Producers are seeing the benefits of including winter cereals as a part of their rotation. Winter wheat generally will yield higher than spring wheat varieties. This project is important to inform producers of the basic agronomy of growing winter wheat. Important points to growing a successful winter wheat are selecting a good quality seed free of disease, using adequate phosphate fertilizer, seeding shallow, and considering proper field rotations. Inadequate phosphorous will lead to a weak slow emerging plant that is more subject to winter kill or diseases. Phosphate is utilized twice, first in the fall during germination, then in the spring when roots are formed from the crown. It is suggested that seeding in southern Saskatchewan is completed by the end of the first week in September (Linnell, 2003).

Study Description

This trial was seeded at a rate of 100 lbs. per acre in the fall of 2002 at the main South East Research Farm site. Phosphate was applied with seed at a rate of 20 lbs. per acre. Two separate trials were completed; the first used seed received from the U of S and the second with seed available from Montana. Both trials were randomized complete block designs. The U of S trial had nine treatments and four replicates. The Montana trial had four entries, but only three replicates due to a limited seed supply. The crop was harvested in late August of 2003 and yield was measured.

Results and Conclusions

Table 1 shows yields from trial one, yields were shown to be significant. Yield results in trial two were not significantly different; there was too much variance within the replicates. Mean yields reported are shown to indicate yield potential, but do not necessarily show how the varieties should rank within themselves. Yield results are low for these winter cereal crops; plant stands were thin throughout the summer leading to decreased yields.

Table 1. Mean yields of Saskatchewan sourced winter cereals.

Variety	Yield (bu/ac)*
Dakota	52.1 a
AC Rifle	36.1 b
Prima	35.7 b
CDC Osprey	35.1 bc
CDC Clair	29.8 bcd
CDC Harrier	27.8 bcd
Pika	25.9 cd
CDC Raptor	23.1 d
LSD ($p<0.05$)	9.3

*moisture adjusted to 14.5%
[1]values followed by different letters are significantly different.

Table 2. Mean yields of Montana sourced winter cereals.

Variety	Yield (bu/ac)*
Big Sky	38.4
Erhardt	28.9
Nusky	34.8
m79426	41.7
LSD ($p<0.05$)	NS

Indication for Further Development

Winter cereals are gaining more popularity with producers. Workload can be spread out throughout the season. New marketing opportunities and better yielding varieties will entice more producers to include winter cereals into their rotations. Programs from groups such as Ducks Unlimited Canada promote growing winter cereals due to the benefits for waterfowl spring nesting. Future studies will examine variety suitability within different areas. Fertilization trials are also in progress and will continue to be examined.

Nitrogen Fertility of Winter Wheat Demonstration

Summary

There are a number of options for applying nitrogen fertilizer on winter wheat. Fertilization at seeding, late fall and early spring were examined in this demonstration. At each of the three application times two nitrogen rates were used. Each rate was also applied with and without Agrotain. Agrotain urease inhibitor is a fertilizer additive for urea and UAN solution fertilizers that stops volatility for up to fourteen days by inhibiting the activity of the urease enzyme. The high rate was 100 lbs. N per acre and low rate was 40 lbs. N per acre. Trends showed that late fall application provided best yield results while spring application showed poorest response to nitrogen application, but only one replicate was examined so no conclusive results can be made.

Background and Objectives of Study

This project was set up for demonstration purposes only. It was in cooperation with the Saskatchewan Soil Conservation Association (SSCA). The objectives were to demonstrate the optimal time and rate of nitrogen fertilization on winter wheat as well to introduce Agrotain fertilizer additive.

Study Description

This study was conducted at the main site of the South East Research Farm. One replicate was seeded because this is intended for demonstration purposes only. Winter wheat was seeded on September 11, 2002 at a depth of three-quarters of an inch. Each treatment received a base application of 0-25-10-10 that was sidebanded. Thirteen treatments in total were observed, including one not receiving any nitrogen fertilizer. The remaining twelve treatments received nitrogen (46-0-0) at two rates. The high rate was 100 lbs. N per acre and the low was 40 lbs. N per acre. At each of these rates one treatment received an Agrotain application. Nitrogen fertilization occurred one of three times: 1. at seeding (sidebanded), 2. late fall broadcast (November 7, 2002), and 3. early spring broadcast (May 15, 2003). All thirteen treatments are shown in Table 1. Seed yield was collected at harvest.

Table 1. Nitrogen treatments demonstrated on winter wheat.

Seeding (sideband)*	Late Fall (broadcast)	Early Spring (broadcast)
No nitrogen	40 lbs. N	40 lbs. N
40 lbs. N	100 lbs. N	100 lbs. N
100 lbs. N	40 lbs. N with Agrotain	40 lbs. N with Agrotain
40 lbs. N with Agrotain	100 lbs. N with Agrotain	100 lbs. N with Agrotain
100 lbs. N with Agrotain		

*rates shown are lbs. nitrogen per acre

Greenfallow Termination Trial

Summary

The use of green manure for increasing soil fertility and organic matter is a practice utilized by conventional and organic producers. Rising fertilizer costs will increase popularity of green manures as fertility alternatives. Pulses are used most commonly as a green manure crop. AC Greenfix (a chickling vetch) is a relatively new legume variety that requires a lower seeding rate compared to other legumes such as peas. Peas, AC Greenfix, and a non-fixing check, canola were used as green manure crops. Spring wheat was seeded the year following the green manure and wheat yield was measured. Three methods of terminating the crops were examined: soil incorporation at mid-flowering, mid-flowering herbicide desiccation, and harvesting at maturity. Terminating the green manure crop at mid-flowering by either method showed higher yield compared to harvesting the green manure crop. No significant differences between either mid-flower termination methods against yield were present.

Background and Objectives of Study

Green manure has been used as an alternative to commercial fertilizers for conventional and organic producers. The use of legumes as a green manure has been common practice because of the nitrogen fixation benefits for the soil. AC Greenfix, a chickling vetch, is a legume that will fix the same amount of nitrogen into the soil as other legumes but require a lower seeding rate (70 lbs./ac) compared to other legumes. Forage uses are not possible for AC Greenfix due to the high levels of neurotoxins present in the plant. Common practice when growing green manure crops is to till the crop into the soil before maturity. Other alternatives will be examined in this study. These include harvesting the crop in the fall and also desiccating the crop with glyphosate. The objective of this trial is to investigate and demonstrate the advantages and disadvantages of using green manure the year prior to seeding spring wheat.

Study Description

This trial was initiated in the spring of 2002 when the green manure crops were established. Three crops were selected for evaluation as green manure; they were canola – a non-nitrogen fixing check crop, peas- N fixer, and AC Greenfix – commercially grown N fixer. The canola as mentioned, was included in order to correctly measure the N effect on the subsequent crop. An effect also known as rotation effect is measured when growing a crop on species/crop type differing stubble. Since canola does not fix nitrogen and is yet a broadleaf crop, we can correctly look at the advantage of green manuring in the south east. Three methods of terminating each crop were evaluated. The first was to till the crop into the soil at mid-flowering, second was to desiccate with glyphosate at mid-flowering, and third by harvesting the seed at maturity. These methods were developed to: demonstrate the typical termination method at peak N accumulation in the biomass, to incorporate in a zero-tillage aspect leaving all biomass on the surface, and to measure N turnover loss by harvesting the seed – the largest N sink in all the crop

types. A total of nine treatments and four replicates made up the randomized complete block design. Canola was seeded at a rate of five pounds per acre, with a fertilizer blend of 70-20-0-10 applied at seeding. The inoculated peas were seeded at 220 pounds per acre and received 20 pounds phosphate with seed. AC Greenfix was inoculated and seeded at a rate of 140 pounds per acre due to poor seed germination, it received the same amount of fertilizer as the peas. Crops were terminated in 2002 according to protocol. In the spring of 2003, Prodigy wheat was seeded across the old treatments. Seed yield was obtained after harvest.

Results and Conclusions

Terminating the greenfallow crops at mid flowering showed higher yields than crop termination at harvest (Table 1). Peas terminated at mid-flower via herbicide and tillage showed highest yields of 22.8 and 22.6 bushels per acre respectively. These yields were not significantly different to those of Canola terminated at mid-flowering or those of all three treatments of AC Greenfix. Termination by harvest had the lowest yields, as one would have expected, there were no significant differences shown between the three crops in the harvest treatments.

AC Greenfix had yields that were equal to each other in all treatments. There was no significant benefit on yield for terminating the crop at mid-flower as shown in the other two crops.

Crop termination by herbicide would be the best option for terminating crops at mid-flowering. There were no significant differences observed between herbicide and mechanical crop termination at mid-flowering in each of the crops. Tilling a well-established greenfallow crop could lead to problems of plugging the tillage implement, increased soil moisture loss, and damaged soil structure. Herbicide application is much easier and will help conserve soil moisture for the following crop.

Table 1. Redvers mean wheat harvest yields 2003.

Crop	Termination Method	Wheat Yield (bu/ac)*
Canola	tilled @ mid-flower	22.3 ab[1]
Canola	desiccated @ mid-flower	22.2 ab
Canola	harvested	17.8 c
Pea	tilled @ mid-flower	22.6 a
Pea	desiccated @ mid-flower	22.8 a
Pea	harvested	19.8 bc
AC Greenfix	tilled @ mid-flower	21.5 ab
AC Greenfix	desiccated @ mid-flower	21.4 ab
AC Greenfix	harvested	20.4 abc
	LSD ($p<0.05$)	2.7

*moisture adjusted to 14.5%

[1]means followed by different letters are significantly different

Indication for Further Development

It would be important to get more site years for this study. Seeing that the non-nitrogen fixing canola crop yielded just as good as the nitrogen fixing legumes might indicate the validity of this particular trial is poor. We know that the base rate of fertilizer the wheat received at seeding did not influence yields because there were significant differences observed between some of the treatments. It would be beneficial to examine green manure crops and their effects on recropping again.

Regional Variety Trials

Summary

The South East Research Farm participated in numerous variety trials this past season. Many cereal and bean varieties were evaluated for their yield capabilities. The Canadian Western Red Spring (CWRS) wheat variety trial consisted of twenty varieties. There were seven varieties involved with the Canadian Prairie Spring (CPS) wheat variety program. In the Canadian Western Extra Strong (CWES) variety trial there were seven entries. For the Durum variety trial were six varieties. Twelve oat varieties were evaluated. For six-row barley there were nine varieties and thirteen varieties in the two-row trial. The beans saw eighteen varieties in that trial. Due to contracting commitments, SERF in unable to release yield information. This information will only be available through the seed guide. The tables below show which varieties were involved in the testing at SERF.

CWES	ES41
AC Barrie = BW661	ES54
AC Glenavon = ES13	ES63
CDC Rama = ES21	ES67
CWRS	
AC Barrie = BW661	BW776
5500HR = BW245	BW781
Superb = BW252	PT555
Kanata = BW263	PT559
Snowbird = BW264	BW297
Journey = BW243	BW307
5601HR = BW256	BW317
Harvest = BW259	Alsen = BW316
Lovitt = PT205	BW796
BW758	BW799
CPS	5700PR = HY961
AC Barrie = BW661	5701PR = HY962
AC Vista = HY413	HY475
AC Crystal = HY417	HY476
Oats	
Calibre	AC Pinnacle
CDC Dancer	AC Ronald
SW Exactor	Triple Crown
AC Kaufman	OT 7001
AC Morgan	OT2009
CDC Orrin	OT394

Durum	
Kyle = DT375	AV Napoleon = DT494
AC Avonlea = DT661	DT712
AC Navigator = DT673	DT722
6-row Barley	Legecy
Excel	CDC Springside
CDC Sisler	CDC Tisdale
CDC Battleford	Vivar
Lacey	CDC Yorkton
2-row Barley	AC Bountiful
CDC Dolly	Newdale
CDC Helgasson	Niobe
Calder	Rivers
CDC Copeland	CDC Select
CDC Bold	CDC Trey
Harrington	Xena
Beans	
Envoy	HR 100
CDC Whitecap	AC Redbond
AC Cruiser	CDC Pintium
T9803/Cirrus	HR 99
T9601	CDC Minto
L94A001	SC 11745-3
316-13	AC Polaris
CDC Expresso	CDC Crocus
CDC Jet	610-23

Canadian Wheat Board Barley Variety Trial

Summary

Each year the Canadian Malting Barley Technical Centre releases a recommendation list of malting barley varieties for the following cropping season. These are the varieties that are marketed by the Canadian Wheat Board in both domestic and export markets. Both two-row and six-row varieties were established and taken to yield. Yields at the South East Research Farm were respectable for all varieties when grown on summer fallow.

Background and Objectives of Study

In August of 2000 the Canadian Malting Barley Technical Centre was formed. It is an independent, non-profit organization funded by members of the malting barley and malt industry. It is the focal point for applied malting and brewing research. It is based out of the Grain Commission Building. Each year the CMBTC releases a recommendation list of malting barley varieties based on information market and research information they have gathered. The varieties on the list for the 2003-2004 crop season were evaluated for yield and suitability at the South East Research Farm at the request of the CWB.

Study Description

This study was a randomized complete block design containing three replicates and twelve treatments. Seeding rates were calculated using the following equation:

> **Seeding rate** (lbs./ac) = desired plant population/ft^2 **x** 1,000 kernel wt (g) / expected seeds survival (0.90) / 10

The desired plant population used in this study was 22 plants/ft^2. The trial was seeding into very moist summer fallow on June 8, 2003. Seed was placed at a depth of 1.25" from the soil surface and fertilizer was banded 1.25" below and 1" to the side of the seedbed. Fertilizer was applied at a rate of 90-20-10 lbs per acre. The trial was straight cut on September 6, 2003 and mean yields obtained.

Results and Conclusions

Yields were respectable (Tables 1 & 2), though yields were not significantly different. When grown under a no-till situation, yields would not be expected to be quite as high due to increased soil moisture in fallow. The two-row varieties out-yielded the six-row varieties when compared as groups. All the varieties indicate that they are capable of producing fair yields. Newer varieties such as CDC Copeland and Lacey fit well with established varieties. Once markets develop and testing is complete, these two varieties should become widely available. Currently, export markets are expanding and six row varieties CDC Sisler and Legacy have growing demand, although limited at this time.

The 2004-2005 recommended malting barley variety list has been released by the Canadian Malting Barley Technical Centre (www.cmbtc.com). The list clearly indicates the increasing acceptance of new barley varieties by the international and domestic barley users. They state that two-row varieties AC Metcalfe, CDC Kendall, Merit and CDC Copeland are on the increase, while Harrington declines. There is stable market demand for both CDC Stratus and Stein. Six-row varieties, Excel and B1602 have stable established demand, while Robust demand is decreasing. Legacy and CDC Sisler both show increasing demand, although limited at this time. For more information regarding markets on prairie produced malt barley consult the Canadian Wheat Board's webpage available at www.cwb.ca or contact a CWB representative. Andy Klippenstein is the Farm Business Representative for the Moosomin area, his phone number is 306-435-3385.

Table 1. Mean yields of CWB recommended row malting varieties grown in Redvers.

Two Row	Yield (bu/ac)
CDC Stratus	74.1
Stein	73.6
CDC Copeland	73.3
AC Metcalfe	70.6
Merit	68.9
Harrington	68.0
CDC Kendall	63.5

Table 2. Mean yields of CWB recommended row malting varieties grown in Redvers.

Six Row	Yield (bu/ac)
CDC Sisler	68.7
Legacy	68.3
Excel	64.6
Lacey	60.2
Robust	58.5

Benefits of Swine Manure Injection on Wheat

Summary

This project was established to demonstrate to hog producers, farmers, Ag professionals, and the general public the importance of applying hog manure at rates equal to the requirements of the crop. High costs of manure application to the farm usually mean it is applied at very high rates (3X) usually based on a three year nitrogen supply. The high rates lead to decreased agronomic performance of the crop and large N_2O (nitrous oxide) contributions to greenhouse gas levels. Proper application rates will increase crop performance while significantly decreasing N_2O emissions. The 3X (9000 gallon/acre) rate of swine manure did not negatively impact the crop yield. . Release levels of N_2O were not recorded. Swine manure applications can produce grain yields equal to and above those of commercial nitrogen applied at 70 pounds per acre.

Background and Objectives of Study

Swine manure is usually surface applied and incorporated or banded at very high application rates, aiming to supply N on a three year basis (3X). High application cost is the determining factor for application rates. Rising environmental concerns have called for improved application techniques and application rates equal to crop needs. Previous research conducted by the University of Saskatchewan and the Prairie Agricultural Machinery Institute (PAMI) in Humboldt have shown that the 3X application rate (9000 gallons per acre) resulted in poor agronomic crop performance and large N_2O emissions. The research showed that when manure was applied at a rate equal to crop needs that N_2O emissions were significantly reduced compared to the 3X rate. Do to the seriousness of the N_2O gas in the environment it is important that producers and the public are informed about the importance of appropriate swine manure application rates.

The objective of this demonstration is to show the best management practice (BMP) for injecting liquid swine manure for annual crop production. In addition to the BMP, the demonstration will also show the negative agronomic effects of over application of swine manure. It is the intention of the project to maximize the exposure of the demonstration to hog producers, farmers, Ag professionals, and the general public.

Study Description

This study design was a randomized complete block with eight treatments and four replicates. Treatments one, two and three consisted of liquid swine manure injected pre-seeding at rates of 3,000 (1X), 6,000 (2X) and 9,000 (3X) gallons per acre respectively on April 30. Treatments four, five and six liquid swine manure were injected at 3,000 (1X), 6,000 (2X) and 9,000 (3X) gallons per acre respectively post-emergent on June 4th. Treatment seven received 70 pounds per acre of urea nitrogen sidebanded at time of seeding. Treatment eight did not receive any nitrogen or manure. Prodigy wheat was

seeded at 100 lbs./ac on May 21st without starter phosphate. Plots were harvested and yield and protein levels calculated.

Results and Conclusions

Pre-seeding manure injection had the highest yields (Table 1.) but they were not different from each other. Sampling error might have occurred with the treatment that received 6,000 gallons per acre of liquid swine manure post-emergent. That particular treatment had a yield lower than the commercial fertilizer while the other two post-emergent treatments both yielded higher than the commercial fertilizer treatment. The trend suggests that injecting swine manure increases yield equal to or above those obtained by commercial urea.

Table 2 presents the protein levels for each of the treatments. The check which did not receive commercial fertilizer or manure had the lowest yield and protein levels. There was a trend for the liquid swine manure to increase the protein levels above those of the commercial fertilizer but the levels were not significant. Using swine manure will not cause yield drags or reduce protein in wheat crops compared to using commercial fertility practices.

Table 1. Mean yields of Prodigy wheat with varying fertility rates and application timings.

Treatments	Yield (bu/ac)
Spring pre-seed 3x swine manure (9000 gpa)	35.2 a[1]
Spring pre-seed 1x swine manure (3000 gpa)	32.3 ab
Spring pre-seed 2x swine manure (6000 gpa)	32.1 abc
Post emergent 1x swine manure (3000 gpa)	29.8 bcd
Post emergent 3x swine manure (9000 gpa)	28.9 cde
Commercial fertilzer 1x (70 lb N/ac)	26.2 def
Post emergent 2x swine manure (6000 gpa)	25.4 ef
Check no manure or fertilizer	22.7 f
LSD ($p<0.05$)	3.9

[1]values followed by different letters are significantly different.

Table 2. Protein values for liquid swine manure trial.

Treatments	Protein
Spring pre-seed 3x swine manure (9000 gpa)	15.2 a[1]
Spring pre-seed 2x swine manure (6000 gpa)	15.1 ab
Post emergent 3x swine manure (9000 gpa)	15.1 ab
Spring pre-seed 1x swine manure (3000 gpa)	14.9 ab
Post emergent 2x swine manure (6000 gpa)	14.7 ab
Post emergent 1x swine manure (3000 gpa)	14.1 ab
Commercial fertilzer 1x (70 lb N/ac)	13.6 ab
Check no manure or fertilizer	13.3 b
LSD ($p<0.05$)	1.9

[1]values followed by different letters are significantly different.

Indication for Further Development

The objectives of this study were not met at this site. Continued study is required to examine the proper application rates that will meet and exceed the needs of the crop. Projects like this one are important to increase awareness of problems, advantages and issues regarding manure applications in commercial farmlands. The perceived effect greenhouse gases have on the environment is not diminishing. Increased pressure by the public for agriculture to be environmentally accountable reiterates the importance of these regional projects. Development and adoption of beneficial management practices are in everyone's favor.

Cool Season Warm Season Annual Forage Trial

Summary

This study aims to provide information to producers for selecting annual forages for livestock feed production. Annual forages can be used in three manners: they can be grazed, cut for silage or bales or swath grazed during late fall and winter. New warm season crop types need to be assessed to determine their local adaptability as a forage. Eleven crops consisting of warm and cool season crops were planted at Redvers at two seeding dates to examine forage yields and qualities in a grazing and swath grazing system. This study was repeated at other Agri-ARM sites in Saskatchewan for regional comparison. Seven core crops were planted at Agri-ARM farm sites Swift Current, Scott, Loon Lake (satellite of Scott), and Melfort, as well as an additional four crops grown in Redvers, Canora and Indian Head. Mean yields have been collected but statistical analysis and forage quality tests have yet to be completed.

Background and Objectives of Study

This study was developed to evaluate cool and warm season annuals for adaptation, quality and yield production for green feed and swath grazing systems in Saskatchewan. Results will help producers decide which annual forage to produce. Newer warm season crops will be evaluated against traditional cool season crops to see their potential advantages. With the continuing concern of BSE livestock producers might need to hold their animals from market, diminishing traditionally adequate feed stocks. Annual forages can provide quality feed alternatives within one season whether it is grazed through the summer or swathed and left for grazing in the fall into the winter.

Study Description

Eleven annual forage crops consisting of either cool or warm seasoned crops were seeded at two dates at Redvers (Table 1). The early seeding date was May 26, 2003 and the late seeding date was June 19, 2003. A split-plot design was used for the study with seeding date assigned the main plot effect and crop type the split plot effect. Related seeding information is provided in Table 1. Crops were sampled twice throughout the season for grazing quality and yield and once in December for swath grazing quality. Samples were gathered by collecting four one meter rows and bulking them together. First sampling was occurred at milk dough for oats, soft dough for barley, two to three weeks after heading for all millets and sorghum, and at 50% milk line on kernel in corn. Second harvest dates were approximately two weeks following the first harvest. At the second harvest the late seeded plots were cut for swath grazing sampling in December.

Table 1. 2003 treatments for annual forage trial in Redvers for each seeding date.

Annual Forage	Treatment #	Crop Type	Seeding Rate (lbs./ac)	Nitrogen (lbs./ac)	Phosphate (lbs./ac)	Spacing (inches)
Oat AC Pinnacle	1	Cool	105	50	20	10
Barley - Ranger	2	Cool	100	50	20	10
Crown Millet	3	Warm	20	50	20	10
Golden German Millet	4	Warm	20	50	20	10
Megagreen Sorghum Sudangrass	5	Warm	20	50	20	10
Corn	6	Warm	15	50	20	10
Corn with 120 lbs N/ac	7	Warm	15	120	20	20
Seberian Red Foxtail Millet	8	Warm	20	50	20	10
Strain R German Millet	9	Warm	20	50	20	10
White Wonder Foxtail Millet	10	Warm	20	50	20	10
Mil-Hy 300 Pearl Millet	11	Warm	30	50	20	10

Results and Conclusions

The plots have been harvested and means generated. However the statistical analysis has not been completed. The means for Redvers are presented below. If you are interested in obtaining a final report for this trial please contact the South East Research Farm Inc. and one will be provided once it is available. The final report will include other Agri-ARM sites, Swift Current, Canora, Indian Head, Melfort, and Scott (plus Loon Lake).

Table 2. Mean dry matter yields (lbs./ac) for the May 26 seeding date on annual forage yields in Redvers, 2003.

	Early Seeding - May 26 (days after seeding)						
Annual Forage	63	74	84	95	102	109	116
Oat AC Pinnacle	4,349	6,132					
Barley - Ranger	4,968	6,680					
Crown Millet		4,244	5,053				
Golden German Millet					6,357		6,411
Megagreen Sorghum Sudangrass					3,471		3,130
Corn				6,883		8,542	
Corn with 120 lbs N/ac				6,705		8,328	
Seberian Red Foxtail Millet			5,185	5,945			
Strain R German Millet					5,664		6,125
White Wonder Foxtail Millet					6,743		6,642
Mil-Hy 300 Pearl Millet					1,810		2,066

Table 3. Mean dry matter yield (lbs./ac) for the June 19 seeding date on annual forage yields in Redvers, 2003.

	Late Seeding - June 19 (days after seeding)					
Annual Forage	60	71	78	85	92	99
Oat AC Pinnacle	4,864	5,722				
Barley - Ranger	5,686	6,241				
Crown Millet	5,082	5,548				
Golden German Millet			5,853		5,909	
Megagreen Sorghum Sudangrass			4,699		4,828	
Corn				7,547		10,131
Corn with 120 lbs N/ac				7,920		8,528
Seberian Red Foxtail Millet		5,240				
Strain R German Millet			5,396		5,911	
White Wonder Foxtail Millet			5,646		6,221	
Mil-Hy 300 Pearl Millet			3,254		3,063	

By the second harvesting dates the oats and barley were found to be too mature to provide a good quality feed. Golden German Millet, Strain R German Millet and White Wonder Foxtail Millet, the later maturing millets, yields were equal to or greater than oats and barley. Pearl Millet and Megagreen Sorghum Sudangrass yields were seen to be below those of oats and barley. Crown Millet and Siberian Red Foxtail Millet had yields just below those of the later maturing millets. Corn showed yields above the oats and barley but the cost of producing the corn has not been determined yet. The final report for the three study should include this information. This report is expected to be complete in spring of 2005.

Previous studies have shown that for each week past the 25th of May that oats and barley are seeded that yields decrease in oats and barley by ten percent per week. The later maturing millets show that they are capable of producing yields equal to or greater to oats and barley while retaining their feed value later into the season. From this study it is hoped that recommendations can be made to seed the later maturing millets about the 5th of June without sacrificing yields and quality of the annual forage.

Yellowfeed Forage Trial

Summary

This trial was designed to examine if spraying glyphosate on oat and barley green feed at the normal time of cutting, will influence feed yield or quality. Current recommendations are to cut oats at the milk dough stage and barley at the soft dough stage. Three dates following the crop desiccation were sampled to help determine proper timing of cutting to maximize yield and quality. This study was conducted at two locations within the Agri-ARM group: Indian Head and Redvers. Mean dry matter yields have been determined, but statistical analysis and feed quality testing have yet to be completed. A final report will be available late winter or early spring of 2004.

Background and Objectives of Study

Spoiled green feed resulting from rain damage while in the swath provides a poorer quality feed for cattle. Eliminating the time between cutting and baling will reduce the risk of quality loss of the feed due to the environmental conditions.

A new technique is being examined to eliminate feed quality losses in the windrow due to rain. In this process the annual is sprayed with glyphosate at the same stage as cutting and allowed to dry standing in the field. Once dried the crop may be cut and baled immediately afterwards. The objective of this study was to examine the effect glyphosate has on yield and quality of oat and barley green feed. Cutting timing after desiccation was also examined to see the effect of different cutting dates.

Study Description

This trial was conducted at the main South East Research Farm site in Redvers during the summer of 2003 as well at Indian Head. There were two treatments and four replicates organized in a randomized complete block design. In Redvers, treatment one was AC Pinnacle oats and treatment two was Ranger barley. Both crops were seeded at 100 lbs. per acre on May 23, 2003. The trial received 45 lbs. per acre of nitrogen and 20 lbs. per acre of phosphate sidebanded at time of seeding. On day 67 after seeding when the oats were at the milk dough stage and barley at the soft dough stage, all the treatments were desiccated with 1 L per acre of Roundup Transorb. The first sample was taken on day 67 prior to herbicide application. The three remaining sampling dates were 77, 87, and 98 days after seeding. At each sampling date samples were taken to determine yield and feed quality.

Results and Conclusions

Results presented are only from the South East Research Farm. If you wish to obtain final results including data from the Indian Head trial please contact the South East Research Farm and they will be supplied once available in late fall to early spring of 2004.

Table 1. Mean dry matter yield (lbs./ac) for yellow feed trial in Redvers, 2003.

	Cut date (days after seeding)			
Crop	67	77	87	98
Oats	5,020	5,581	5,055	5,457
Barley	5,537	5,769	6,134	6,482

Yields continue to increase after the crop has been desiccated on day 67 except on day 87 of oats where a sampling error must have occurred. This trend of increasing yields after desiccation was also observed in similar studies conducted the previous two seasons. Feed quality analyses has not been completed at this time, but in the previous two years glyphosate was shown not to affect the feed quality. Protein decreases minimally and the available energy remains relatively unchanged.

Dry Bean Agronomy

Summary

A split application of nitrogen fertilizer is a good way to reduce risk in periods of drought. It can also offer yield advantages over applying all the nitrogen in one pass. This study examined what combination of fertilizer rate and application timing produced best yields with CDC Pintium, a dry bean. Results indicated that sidebanding half the nitrogen at seeding and the second half at first flower produced highest yields.

Background and Objectives of Study

Dry bean is an important specialty crop in southeast Saskatchewan. Maximizing yield potential is critical to the success of the crop for a producer. Nitrogen fertility largely influences the final yield of all crops and with increasing fertility costs, maximizing nitrogen utilization will put more in producers' pocket books. Nitrogen requirements vary throughout the season, applying more nitrogen than is needed at that time can lead to nitrogen losses and haying off in dry years. Pinpointing when to apply nitrogen will maximize yields while reducing losses.

This study was established to examine the impact application timing of nitrogen has on dry bean yield. Split and single applications of nitrogen were examined. The three periods of application were at seeding, first trifoliate, and first flower.

Study Description

This study was organized as a randomized complete block design with four replicates and six treatments. The dry bean variety CDC Pintium was seeded into fallow at a seeding rate of 140 lbs/ac at the main site of the South East Research Farm. Twenty pounds of phosphate per acre was applied to all treatments in a sideband at time of seeding. Treatments consisted of varied rates and application timings of nitrogen fertilizer (46-0-0). Each treatment received a combined total of 70 lbs N/ac. Nitrogen applied at seeding was sidebanded. Applications at the third trifoliate and first flower were broadcasted. Single and split applications were evaluated. Complete details on nitrogen rates and application timings are available in Table 1. Seed yield was evaluated after harvest.

Results and Conclusions

Splitting nitrogen application had an increased yield advantage compared to other treatments. Table 1 displays the yields of each treatment. The application of 35 lbs N/ac at seeding then broadcasting that same amount at first flower produced highest yields.

Table 1. Mean seed yields are shown in lbs. per acre. Nitrogen application rates are shown as the amount of nitrogen applied per acre.

	Nitrogen application rates (lbs./ac)			
Treatment	**Seeding (sideband)**	**Third Trifoliate (broadcast)**	**First Flower (broadcast)**	**Yield (lbs./ac)**
1	0	0	0	1772.4 de[1]
2	70	0	0	1936.4 cd
3	35	35	0	2471.4 b
4	35	0	35	3108.4 a
5	0	70	0	1454.7 de
6	0	0	70	2400.3 bc
			LSD ($p<0.05$)	556.5

[1]means followed by different letters are significantly different.

Redvers Co-op Canola Variety Trial

Summary

The Redvers Co-op canola showcase is designed to generate interest in new canola varieties and compare popular existing varieties to each other. Eleven varieties from the three main herbicide tolerant systems were grown at the South East Research Farm in 2003. While yields were affected by in swath wind damage, other comparisons were made. Producers attending the South East Research Farm field day had the opportunity to ask each seed representative questions.

Background and Objectives of Study

There are hundreds of canola varieties available to prairie producers. Choosing a variety can be an overwhelming situation. Many decisions need to be made when choosing a variety, these will include: whether to grow a herbicide tolerant variety and or a hybrid variety. Many of the most popular varieties are herbicide tolerant (HT). There are three main HT systems available to choose from. The three systems are known as Roundup Ready, Liberty Link, and Clearfield production system. The Redvers Co-op showcased eleven of the HT varieties they have available for purchase through them at the South East Research Farm. The objective of the demonstration is to generate producer interest in the existing variety as well as introduce them to some experimental varieties during the annual South East Research Farm field day.

Study Description

This demonstration was a complete randomized block design with three replicates and twelve treatments. Seeding was later than suggested occurring on May 25, 2003 at the South East Research Farm. All varieties were seeded at a depth of .5 - .75" below the soil surface. Fertilizer was sidebanded 1" to the side and 1" below the seedbed in a blend of 70-30-0-10 at 218 lbs/ac. Each of the twelve varieties fit into one of the three herbicide tolerant systems. Seven of the varieties were Roundup Ready, two were tolerant to Liberty Link, and the remaining three fit into the Clearfield system. Half of the varieties grown were hybrids while the remaining varieties were open pollinated. Ratings for height, pods per main stem, maturity and yield were obtained.

Results and Conclusions

Yield results were very disappointing; factors that influenced the yield reductions included late seeding and more importantly wind damage to swaths before harvest. Yields ranged from ten to fifteen bushels per acre. Due to the variability caused from the wind damage we were unable to rank the varieties; thus results will not be shown on an individual treatment basis. Green counts were found to be low for all varieties.

The Clearfield varieties were observed to be the shortest as well as producing the fewest number of pods on the main stem (Table 1.). The Clearfield varieties were also the earliest maturing of all varieties. The tallest variety was the Invigor 2573 with a height of 122 cm, lodging was not found to be a problem in this or any of the treatments. The remaining treatments were all relatively similar in height. The numbers of pods on the main stems for the Liberty Link and Roundup Ready varieties were all similar.

When selecting a variety the most important consideration will be herbicide rotation. Producers need to be aware of what the field history has been in order to avoid possible complications. One of the most common problems seen is when producers are using a pre-seeding burn-off of glyphosate in the year following growing a Roundup Ready crop and not considering volunteer control. Adding a herbicide as simple as 2,4-D will control volunteer Roundup Ready plants.

Table 1. Results from the 2003 Redvers Co-op canola variety showcase.

Variety	HT type	Height (cm)	Pods per main stem	Maturity
Hylite 289	Clearfield	88	16	E
Hylite 292	Clearfield	93	12	E
Clearfield Exp	Clearfield	93	12	E
Invigor 2573	Liberty Link	122	29	M - L
Invigor 2733	Liberty Link	102	21	E - M
Hyola 505	Roundup Ready	108	34	L
Hyola Exp 512	Roundup Ready	99	16	M - L
Advanta Exp Hybrid #1	Roundup Ready	110	28	M - L
Advanta Exp Hybrid #2	Roundup Ready	110	29	M - L
Field King 811	Roundup Ready	102	30	M - L
DKL 35-85	Roundup Ready	95	26	M - L
DKL 34-55	Roundup Ready	108	31	M

E – early, M – medium, L – late

Cargill Specialty Canola Oils Canola Variety Trial

Summary

Cargill Specialty Canola Oils produce canola varieties that are low in linolenic acid. These varieties are low in saturated fats and contain no *trans*-fatty acids because they do not require hydrogenation of the oil. Cargill Specialty Canola Oils offers producers premiums to grow their varieties because Cargill receives premiums for the specialty canola oil produced from the varieties. Some producers perceive the premium as compensation because they believe the varieties are lower yielding. This demonstration shows that two of the Roundup Ready varieties offered by Cargill Specialty Canola Oils were able to yield equally to other popular Roundup Ready varieties.

Background and Objectives of Study

Cargill Specialty Canola Oils has developed and continues to develop canola varieties that are low in saturated fats and linolenic acid. These low levels are very critical because they make the oil that is pressed from the seed stable at room temperatures without the need to be hydrogenated. Hydrogenation is a process that most other canola oils with higher levels of linolenic acid go through to make them stable at room temperatures. A bi-product of hydrogenation is the formation of *trans*-fatty acids. *Trans*-fatty acids have been shown to increase risk of heart disease in humans. Oils produced from the seeds of the Cargill Specialty Canola Oils varieties are free of *trans*-fatty acids because it does not undergo hydrogenation. New labeling laws in Canada and the United States will require food products to include the amounts of saturated fats and *trans*-fatty acids in the next few years. Thus, healthier oils such as those produced by Cargill Specialty Canola Oils will become more popular with consumers.

Cargill Specialty Canola Oils is trying to beat the perception that their canola varieties are unable to yield as well as other canola varieties. Cargill receives premiums from customers that purchase the oil and in return Cargill Specialty Canola Oils pays the producers premiums as well. Most producers see this premium as compensation because the varieties are lower yielding. The purpose of this demonstration was to assess the relative competitiveness of the varieties Cargill Specialty Canola Oils offer with other available canola varieties.

Study Description

A randomized complete block design was used to evaluate five treatments in three replicates. All five varieties were Roundup Ready. Two of the varieties were open-pollinated and the remaining were hybrids. The two Cargill Specialty Canola Varieties were IMC 109RR (open-pollinated) and Victory 1010 (hybrid). Hyola 505RR (hybrid) is an Advanta variety, 45H21 (hybrid) is a Pioneer variety, and Dekalb's DKL 34-55RR (open-pollinated) was the remaining variety. Seeding was late and occurred on June 2nd.

Varieties were seeded at a rate of 5.5 lbs/ac at a depth of.75". A fertilizer blend of 90-30-0-15 at 273 lbs./ac was sidebanded 1" below and to the side of the seedbed at time of seeding to all treatments.

Data recorded included: vigor, plant height, maturity, and yield.

Results and Conclusions

Yields between the varieties were not significantly (Table 1.) different beating the perception that the Cargill varieties are lower yielding compared to others. Yields of all varieties were reduced due to the late seeding date. Flowering occurred during the high daytime temperatures observed through July which would have also decreased yield potential.

Table 1. Results of the canola variety trial in Redvers, 2003.

	Vigor	Plant ht (cm)	Maturity	Yield (bu/ac)
Victory 1010	Very Good	96.1	Early	20.7
IMC 109RR	Good	84.1	Medium	20.1
DKL 34-55RR	Good	92.2	Medium	20.5
Hyola 505RR	Good	95.9	Late	20.0
45H21	Very Good	86.7	Early	17.7

Cargill Specialty Canola Oils offers premiums for growers who contract to produce their varieties. Premium amounts vary depending on delivery period that was contracted. IMC 109RR and Victory 1010 offer producers the possibility of increasing your gross return per acre as well as producing a healthier product. For more information on these and other varieties offered by Cargill Specialty Canola Oils please contact Gerald Girard at 204-436-2010.

Flax Fibre Agronomy Trials

Summary

Stem diameter and fibre content are influenced by agronomic factors such as variety selection, seeding rate, and row width. Common practices for producing oilseed varieties will produce inconsistent stem diameters and variable fibre yields that are undesirable for fibre processing. Strategies for growing flax for fibre utilize a narrow seed row and higher seeding rates; these produce more consistent stem diameters and fibre yields. Narrow seed rows are not desirable for zero-till systems due to the high levels of residue. An air delivery system using a "Frock Boot" will be evaluated for its suitability of providing more uniform seed distribution of the seedbed to increase consistency of stem diameter and fibre content. Harvesting techniques and straw collection timings will help evaluate proper timings for maximum returns. This is year one of a three year study, final results will be available in the spring of 2006.

Background and Objectives of Study

Production systems for oilseed and fibre flax tend to be quite different. Oilseed production on the prairies is primarily row seeded. This method places seeds in narrow slots or rows with a relatively large distance (i.e., 20 cm) between rows. This seeding method creates variable stem size and diameters. Previous research by Biolin has shown that more random distribution and a higher seeding rate is required in order to have thinner and more uniform stem diameter which ret faster and more consistently and tend to have higher fibre content.

In areas where flax is grown for fibre, the crop is usually sown at three times the normal oilseed flax seeding rate in a ribbon pattern with 6-10 cm between each row. This gives relatively thin and consistently sized stems that ret quickly and have relatively high fibre content. A seeding system similar to this is not well suited for zero-till systems with high residues. A method in previous work, completed by Byron Irvine, indicated that using an air seed delivery system with "Frock Boot" sweeps is able to distribute seeds in a near broadcast pattern.

There is a need to develop a well-defined agronomic package for producers in order to grow consistent quality fibre for processors to reach higher value end products. Methods of seeding and harvesting influence fibre yields. Evaluations of each will help determine what methods provide best results.

Study Description

Three, three year studies have been initiated to study flax fibre production. These trials will be located at three Agri-ARM sites: Redvers, Canora, and Indian Head.

Trial 1 – Effect of seeding system and seeding rate on yield of flax fibre

The two seeding dates were May 10 and May 30. There were three varieties seeded at varying rates using two types of openers. Flanders, Hermes and Taurus were the varieties selected. Table 1 indicates the treatments. Plant samples were taken for fibre analysis. Stem diameter distributions, straw weight, fibre content (%), fibre yield, seed yield and seed oil will be calculated.

Table 1. Treatment list for Trial #1.

Variety	Seeding Rate (lbs/ac)	Opener	Seeding Date
Flanders	120	Sweeps	both
Flanders	40	Hoe	both
Flanders	40	Sweeps	both
Flanders	80	Sweeps	both
Hermes	120	Sweeps	both
Hermes	40	Hoe	both
Hermes	40	Sweeps	both
Hermes	80	Sweeps	both
Taurus	120	Sweeps	both
Taurus	40	Hoe	both
Taurus	40	Sweeps	both
Taurus	80	Sweeps	both

Trial 2 – Field retting from various straw management options

One oilseed variety was seeded to evaluate four harvesting techniques. Touchdown was applied at 1 L per acre prior to harvest. Treatment one, a combine was used to harvest the flax, cutting as low as possible. Then using a pea roller, straw was rolled into the ground. Treatment two, the flax was harvested as low as possible with a combine, and straw not pressed with a roller. Treatment three, the seed was stripped off using the combine. Then the straw was cut using a sickle bar mower and rolled with a pea roller. Treatment four, the seed was stripped off, and straw was cut using a disc mower and rolled afterwards. Samples of straw were taken at wetness intervals of 30, where leaf wetness equals (# hours wet/24)*(# hours > 10 ^{o}C/24). Fibre content and yield will be determined at each sample date to determine what time will maximize yield.

Trial 3 – Effect of seeding method and variety on fibre content of Linseed and Solin varieties

Twenty-one varieties were each seeded with a hoe and sweep opener for a total of 42 treatments. The sweeps utilized an air seed delivery system that spread the seed across the seed bed where as the hoe used a gravity fed seed delivery system. Table 2 shows the varieties included in this trial. Each treatment had seed and straw yields determined. Fibre yet will also be determined for each treatment.

Table 2. Variety list for trial 3.

Varieties	Normandy
Vimy	Taurus
Arras	Valour
Bethune	Watson
Carnduff	Linola1084
Flanders	Linola2047
Hanley	Linola2090
Lightning	Nugget
Macbeth	Omega
Mons	Hala
Norlin	Hermes

Results and Conclusions

A final report will be completed in the spring of 2006. Preliminary results for 2003 have not been analyzed. If more information is desired please contact the South East Research Farm for details.

Fiber Flax: A New Opportunity for Saskatchewan Farmers

Summary

World shortages of textile grade flax fibre have generated interest in Saskatchewan's ability to produce quality textile grade flax. Biolin Research Inc. from Saskatoon has provided fibre flax varieties for evaluation at Redvers. Biolin will also be completing all fibre evaluations to determine which varieties of fibre flax will give superior performance in Saskatchewan conditions. This work needs to be completed over a number of widely separated locations over a number of years before strong conclusions can be made. In 2003, trials are being carried out at Indian Head, Redvers, Churchbridge, Canora, Preeceville and Tisdale.

Background and Objectives of Study

Flax has been grown for over 5,000 years and during almost all of that time it was grown mainly as a source of fibre with seed considered a by-product. However, when Western North America was settled, there was a high demand for linseed oil based paint and a shortage of labor to extract the fibre from traditional fibre flax varieties. In addition, cotton was cheap and plentiful. The results were that plant breeders and government agronomists in Western North America concentrated on developing flax varieties that had high seed yields and lower fibre content. Since that time, farmers in Western North America have been planting oilseed flax and burning, selling or trying to work the straw into the land. Many of us have forgotten that much of the world outside of North America still grows flax for the fibre.

New developments in linen fabric and garments have increased the demand for flax fibres for textile use. China is now the world's largest producer of linen garments but many of its linen mills have to close for several months every year because of a worldwide shortage of textile grade flax fibre. The Chinese often pay the highest prices for high grade flax fibre in the world and are very interested in investigating if Saskatchewan can supply them with textile grade flax fibre.

Study Description

Two trials are being hosted by the South East Research Farm for Biolin Research Inc. Seed for these trials was supplied by Biolin Research Inc. from Saskatoon. Biolin will also be doing the fibre evaluation after harvest. All the fibre varieties that are being grown in these trials originate in France, Belgium or Holland. In the past, Biolin Research has also tried varieties from Poland, the Czech Republic, Russia and China.

Trial 1 – Four, one acre plots were established, the varieties were: Ilona, Electra, Hermes and Evelyn. Seeding was completed by PAMI using a modified drill with sweep type opener to try and evenly distribute the seed across the seedbed. Biolin used a specialized

piece of equipment designed specifically to pull the flax in each plot in late August. The machine pulled a four foot width of flax and placed it into a windrow. Approximately two weeks later, Biolin returned with another specialized piece of equipment to turn the windrow. Biolin was supposed to return later to bale the straw, but due to a dry fall, conditions were not favorable for retting to occur to desired levels. Baling should occur in spring of 2004. Biolin will evaluate fibre at that time.

Trial 2 – Eight fibre varieties were replicated four times each – Diva, Diane, Ariane, Viking, Escalina, Marylin, Argos, and Venus. An oilseed flax, Vimy, was selected as a check. These varieties were also seeded using a modified drill with sweep type openers. Biolin collected plant samples for fibre evaluation. Seed was harvested to determine yield.

Results and Conclusions

Results will be generated by Biolin Research Inc. of Saskatoon. Fibre analysis is being completed during the winter of 2004. For further information please contact Alvin Ulrich, Biolin Research Inc., 103 – 110 Research Drive, Saskatoon, S7N 3R3, Telephone: 306-668-0130, Fax: 306-668-0131. Email: aulrich@biolin.sk.ca

Economic Analysis of Field Scale 'Pesticide Free Production™' of Flaxseed

Summary

The flax variety *CDC Bethune* was grown under two cropping systems. The most common conventional method will be compared to growing flax under the Pesticide Free Production™ (PFP™) guidelines. Two PFP™ treatments will be compared to one conventionally grown treatment. Economic analysis will be completed on each of the three treatments to determine if PFP™ is economically viable in field scale production of flaxseed. Average market prices from October 1, 2003 to March 1, 2004 for each system will be used in the analysis. Net yields between each crop were not significant, but final economic analysis will determine differences.

Background and Objectives of Study

Pesticide-Free Production™ involves planting a non-GMO seed in fields where residual pesticides are not commercially active, and then raising and harvesting the crop without the use of chemical pest control methods. The main advantage of PFP™ (besides possible price premiums) is that it brings together tools from conventional and organic farming and as such, the system is easily adopted by producers. It is a very flexible farming system, allowing full use of commercial fertilizers and some latitude with pesticides outside of the PFP™ crop's growing season.

The field scale study was initiated following a small plot trial conducted at the South East Research Farm the season prior. Field history indicated that flax would be a good crop option for the PFP™ project. The objective of the field scale research is to determine whether or not the implementation of "Pesticide Free Production" is economically viable in field scale production of flaxseed.

Study Description

The field portion of this study occurred near Fairlight Saskatchewan. Certified seed of the flax variety *CDC Bethune* was selected. Three treatments were used, one was conventional and the other two being PFP™. The complete field received a pre-seeding application of 1 L per acre of Touchdown on May 27. All three treatments received the same rate of fertilizer that was sidebanded at seeding. The fertilizer was a granular blend of 60-25-0-10. The conventional treatment was treatment one, the seeding rate was 45 lbs/ac on June 6th. Treatments two and three were grown using PFP™ guidelines with increased seeding rates of 56 lbs/ac. Treatment two was seeded in one pass on June 6th. Treatment three was seeded in two passes each at the seeding rate. During the first pass the full rate of fertilizer was applied. The second pass was seeded perpendicular to the first. The third treatment was seeded on June 8th due to precipitation received on June 6th.

Herbicide control was required in treatment one, Flaxmax (50g/L clopyralid and 280 g/L MCPA ester) was applied at 27 acres per case (0.61 L/ac) on July 12 to help control weeds.

Harvesting occurred over two days; September 23rd and 25th were the dates. Measured strips in each treatment were harvested to calculate yield and dockage. Conventional grown flax was delivered to SWP Fairlight and the PFP™ grown flax was binned for sale in the PFP™ market.

Results and Conclusions

An economic analysis will be completed for each treatment during the winter of 2004 with final results expected in spring of 2004. Average market price from October 1, 2003 to March 1, 2004 will be used for each production system. This will alleviate the ability to control value of production by controlling the date of sale for each commodity.

Gross harvest yields and dockage are shown in Table 1. Differences between yields of each treatment are not significant. Complete economic analysis will determine differences between each treatment. Once final analysis is complete it will be made available to all interested through the South East Research Farm.

Table 1. 2003 gross and net yield of flax produced near Fairlight, SK.

Treatments	Gross Yield (bu/ac)	Dockage (%)	Net Yield (bu/ac)
Conventional	25.1	3.6	24.2
Single seeded PFP	26.7	9.6	24.2
Cross seeded PFP	25.6	7.2	23.8

Financial support for this project has been provided by the Canadian Adaptation and Rural Development Fund in Saskatchewan (CARDS). Funding for the CARDS program is provided by Agriculture and Agri-Food Canada. Pesticide Free Production and PFP are registered trademarks of the University of Manitoba. For more information about Pesticide Free Production please visit www.pfpcanada.com on the Internet.

Hybrid Poplar Demonstration

Summary

This demonstration was created to develop interest and awareness of agroforestry on the prairies at a producer level. With positive contributions hybrid poplar production can make to greenhouse gas reductions and possible revenue generation from cuttings sales, more interest will be generated at a local level. Walker poplar cuttings, a female hybrid clone, were planted at the South East Research Farm. They showed rapid growth of up to 130 cm through the season. Available moisture was the limiting factor through the season. Survival was good except by fault of human error regarding spray drift. All growth was cut back to about ten centimeters above ground. 25-centimeter cuttings were made from whips that had a diameter of 1.5 cm or more. These cutting were stored frozen and will be used as replacements in 2004.

Background and Objectives of Study

Concerns of deforestation and the levels of greenhouse gases (GHG) in the environment are growing. Producing hybrid poplars in plantations on the prairies is seen as a part of the solution to address the problems above. Trees have the ability to use carbon dioxide from the atmosphere during photosynthesis and fix it into carbon. Dried wood is about half made of carbon; therefore it would be easy to calculate the amount trees are able to contribute to reducing the amount of carbon dioxide. The Kyoto agreement mentions that afforestation (ie. the planting of trees on previously unforested land) is an acceptable way of reducing net carbon dioxide emissions.

The Prairie Farm Rehabilitation Administration's (PFRA) Shelter Belt Centre in Indian Head has worked on breeding fast growing hybrid trees such as the Walker poplar. The Walker poplar is a female hybrid clone that is well suited for growth in Saskatchewan. It can grow up to 130 cm per year and has a life span of 30-40 years. Poplars are easy to propagate vegetatively so they are a good choice for using in a prairie plantation.

By planting the Walker poplars, the South East Research Farm will help increase awareness of agroforestry. Producers and the public will be provided with information about stool-bed poplar production, as well as forest related activities, and the relationships concerning topics such as Kyoto and GHG.

Study Description

Walker poplar, a female hybrid clone was chosen for planting. Two hundred cuttings were received, each with a length of approximately 25 cm. The cuttings were planted into a cultivated soil with about 2.5 cm to 5 cm exposed above the surface of the soil. Cuttings were placed four feet apart within the row and rows were spaced ten feet apart to allow for equipment movement between rows. Fertilizer was not applied during the growing

season, but a blend of 16-16-16 could have been used as a starter. Weed control between rows was cultivated with a small cultivator. Row weed control was completed by hand and hoes. Trees were watered periodically throughout the season using a truck and water tank. If more time was available, a drip irrigation system would have been established. In late November, all new growth was cut to leave about ten centimeters above the soil surface. Top growth with a diameter larger than a pencil was cut into cuttings of approximately 25 cm, the remainder was discarded. New cuttings were placed in freezer bags and stored upright in a freezer for the winter. The new cuttings will be planted back into the stool bed to replace dead trees from the past year.

Results and Conclusions

The trees grew relatively fast even considering the hot dry weather experienced through July and August. Moisture would have been the limiting growth factor. Not enough time was available to provide the trees with the water they required. A sprinkle irrigation was discussed by it was decided that this would promote more work due to the weeds that would have grown also as a result of the irrigation. Drip irrigation would be the best option and should be set up for 2004. Drip irrigation will only water the trees and a small area around the base, only weeds around the base.

Survival was adequate, but some of the trees were exposed to desiccate drift during sprayer cleaning and were lost as a result. The remaining trees all produced at least one shoot of growth ranging in length from 70 to 130 cm in length with a diameter of approximately 1.5 cm at the base and tapering to the end of the whip. Some trees produced two or more whips with only one of them having a diameter large enough for harvest.

Harvest was completed in late November. This may have been on the earlier side of what is suggested. The Saskatchewan Forest Centre suggests that harvest usually occur between December and the first of March when the plant is completely dormant. Ideally harvest should have waited until the New Year in January or February to reduce the storage period. The seasonal laborer was leaving at the end of November so harvest was completed then. The earlier harvest was also easier due to the reduced amounts of snow compared to what was seen at the end of December and early January. New cutting survival will ultimately determine if harvest was too early.

Strawberry Crown Demonstration

Summary

Efforts by the University of Saskatchewan and in cooperation with Agri-ARM are being made to evaluate if strawberry crowns produced in Saskatchewan display Northern Vigour® when grown in California. Previous results from the U of S have shown Saskatchewan grown crowns yield better in California than Californian produced crowns. *Camarosa* strawberries have been grown around the province including at the South East Research Farm to try and determine if Saskatchewan produced a superior yielding planting material to what is currently used in California.

Background and Objectives of Study

Northern Vigour® is a term mainly associated with seed potatoes that are produced in Saskatchewan then transported into the United States. This term describes Saskatchewan produced superior seed potatoes that are grown in a climate of long days and cool nights in a disease-free environment. Work is being completed by the University of Saskatchewan in conjunction with Agri-ARM to see if strawberry crowns produced in Saskatchewan also exhibit Northern Vigour®. Earlier studies conducted by the U of S have indicated strawberry crowns produced in Saskatchewan then grown in California are higher yielding than California crowns. Current research will examine the potential Northern Vigour® response of *Camarosa* strawberry with the primary objective to develop Saskatchewan as a supplier of high quality, superior yielding planting materials for national and international markets.

Study Description

Camarosa strawberry crowns were shipped from California to Saskatoon and distributed from there. The South East Research Farm received 200 crowns, which were seeded on May 14th. The strawberry plants were planted in garden space that had been cultivated prior to planting. Plants were planted one foot apart in each row and at a distance of four feet between rows. Urea was spread by hand to increase the nitrogen rate to about 100 lbs. per acre. Weed control was all completed manually by hand and using hoes. In August, wind was preventing some daughter plants from rooting, this required plants to be dug in by hand. On September 24th daughters were removed from the parent plants and 75 were shipped to Saskatoon then on to California for evaluation. Remaining plants were covered with straw for the winter.

Results and Conclusions

Once planted the plants began to grow almost immediately. Growth was stronger than expected, no plants died as a result of transplanting. The site chosen for the study was not completely suited for strawberry production. Half of the block was shaded for an extra couple of hours every morning by a large evergreen on the corner of the garden. Plants in the shaded area did not produce as many daughter plants as the plants in the sunny area. Plants in the shaded area would have been competing with the tree roots for soil moisture as well. This would have decreased the performance of the plants.

Plants in the sunnier area produced numerous daughter plants each. Most of the daughter plants grew larger than the planting stock we received in the spring. Daughter plants that required being dug into the ground due to wind rooted well. If the soil had been kept moister, there probably would not have been the need to manually dig in these plants. Not all daughters were harvested for shipment to California. Only the strongest 75 daughter plants were selected, all of these were in the sunniest area of the garden away from the tree roots. Harvest occurred right at the end of a cooler spell in September; this is desired to promote the Northern Vigour® development in the daughter plants. Nighttime lows had reached freezing points twice before harvest and no visible symptoms were noticeable.

A total of 3000 daughter plants from Saskatchewan were shipped to California to be evaluated for presence of Northern Vigour®. The University of Saskatchewan had organized other sites that grew the *Camarosa* strawberry for evaluating the daughter plants. Initial reports from California in November indicated that crowns sourced from Saskatchewan were ten to fourteen days more advanced compared to locally produced crowns. The next step is to wait and see if the Saskatchewan plants will yield more fruit than California.

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Acknowledgments

The South East Research Farm continues to receive support from many individuals and business within and around our community. The support does not go unnoticed and contributes to the success of our work. This past year one of the more significant donations would have been the plastic hopper bins. The Redvers Co-op, Bayer CropScience, Monsanto and Brett-Young Seeds all contributed funds for the purchase of the two hopper bins. Other significant contributions included seed for fill areas. Bayer CropScience provided four bags of Invigor canola seed The Saskatchewan Wheat Pool provided 30 acres of Prodigy wheat and 10 acres of Imagine wheat. Imagine is a new Clearfield wheat variety that will be available in small quantities for 2004.

Monsanto supplied the farm with some Transorb for burn-off and to use on the Co-op canola demonstration. Syngenta provided Touchdown for a pre-seeding burn-off for the PFP project at Fairlight. Other companies made contributions as well, but they are too numberous to include. The South East Research Farm Inc. Board of Directors and their employees wish to thank you all for your continued support.

A special thanks to AgriCore United for providing the printing services of this document.

Useful Resources

WebPages

Saskatchewan Agriculture, Food and Rural Revitalization
www.agr.gov.sk.ca

Agri-ARM
www.agr.gov.sk.ca/agriarm

Canadian Wheat Board
www.cwb.ca

Canadian Grain Commission
www.grainscanada.gc.ca

Environment Canada
www.weatheroffice.ec.gc.ca

Manitoba Agriculture, Food and Rural Initiatives
www.gov.mb.ca/agriculture/crops/index.html

Alberta Agriculture, Food and Rural Development
www.agric.gov.ab.ca

Top Crop Manager
www.topcropmanager.com

Saskatchewan Pulse Growers
www.saskpulse.com

SaskFlax
www.saskflax.com

Canola Council of Canada
www.canola-council.org

Agricultural Institute of Canada
www.aic.ca

Agriculture and Agri-Food Canada
www.agr.gc.ca

Saskatchewan Canola Development Commission
www.scdc.sk.ca

Saskatchewan Crop Insurance
www.saskcropinsurance.com

Farm Credit Canada
www.fcc-sca.ca

Prairie Farm Rehabilitation Administration (PFRA)
www.agr.gc.ca/pfra

Background Information

- The South East Research Farm Inc. (SERF) – not for profit producer driven corporation registered in 2001 which had 80 producer memberships in the first year. Non- producer memberships are also available.
- The project began in 1997 as part of the SPOKE program under the Special Crop Area of the Agri-Food Innovation Fund.
- Prior to incorporation of SERF, the project was managed by South East Prairie Rural Development Co-operative Ltd. And operated under the name "Redvers Research & Demonstration Project."
- SERF operated under the direction of nine producer directors who, not only volunteer their time, but also travel to monthly meetings at their own expense.
- Members of SERF have the opportunity to provide input for the development of research projects that are relative to local soils, climate, and growing pressures.
- Prodacer members are eligible to vote at the annual meeting and to be elected as a SERF Director.

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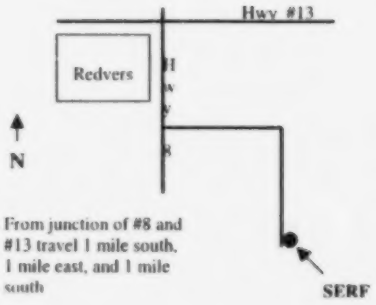

South East

Research Farm Inc.

Redvers, SK

Mission Statement:

"to provide quality applied research and demonstrations that are producer-driven with results extending to and beyond the farmgate to improve agricultural sustainability and encourage environmental stewardship."

Long Term Goal

To become known and respected for providing quality research to the point that groups are competing for our services and expansion of land base and staff is imminent.

South East Research Farm Inc.

Activities →

Effective Applied Research
- Develop and conduct research and demonstration protocols
- Hire and support qualified manager and secure adequate support staff
- Provide necessary infra-structure for applied research
- Access external funding for applied research and development projects… (including infrastructure)
- Reporting of project results on an annual basis
- Selecting producer driven/geographically appropriate research and demonstration projects
- Develop and use a set of guiding principles that are economically feasible and that encourage environmental stewardship

New Technology Validation and Demonstration
- Identify emerging technologies that have potential on a regional level
- Develop collaborative arrangements for testing emerging technology
- Demonstrate at a local level, these new technologies
- Provide advise and expertise of these new technologies to early adopters
- Provide demonstrations illustrating technologies that promote improved environmental stewardship
- Assess the risks of new technologies

Transfer of Knowledge
- Provide pertinent and timely press releases to regional newspapers
- Compile and distribute a final report of all annual projects and a spring newsletter promoting upcoming research activities
- Host or co-host primary and secondary field days highlighting research farm activities
- Host or co-host an annual winter conference to promote awareness of research farm and provide a forum for producer to obtain new information regarding research trials and demonstrations
- Develop and maintain an informative and up to date web-site and promote awareness of it and access to it

Outputs →

Knowledge
- New crops and crop varieties demonstrated
- Information on new and innovative farming systems
- New monitoring and diagnostic tools for production decisions
- A set of guiding principles for demonstrating environmental impacts and economic profitability
- Regionally based agronomic expertise

Information Products and Events
- Field days
- Media packages and events
- Producer meetings
- Presentations at meetings
- Website
- Regional newsletters

Services
- Scientifically valid research processes
- Agronomic advice and expertise for local area farmers
- Hosting commodity specific field days
- Provide access to a safe farm environment
- Technology transfer service on agronomic information for stakeholders, primary clients and partners
- Multi-site co-operator of applied research
- Standardized research and development protocols
- Location for unbiased scientific investigations
- Neutral meeting place for people interested in agriculture
- Needs assessment and problems identification by local farmers

Reach →

Primary Clients (direct beneficiaries)
- Producers
- Commodity groups
- Local agri-business
- Extension staff

Partners (funding and policy)
- Agriculture and Agri-Food Canada (Research Branch and PFRA)
- Saskatchewan Agriculture and Food
- U of S – College of Agriculture
- Provincial Council of ADD Boards
- Agri-Arm

Stakeholders (influenced by outcomes)
- Ducks Unlimited Canada
- Saskatchewan Soil Conservation Association
- Prairie Agricultural Machinery Institute
- Environmental agencies
- Agri-business
- Canadian Wheat Board
- Winter Cereals Canada

Outcomes →

Transfer of Knowledge
- Effective transfer of research knowledge to producers

Producer Driven Research
- Grassroots input to direct the focus of research activities

New Technology and Farming Practises
- Increased adoption of new agricultural production technologies and practises by local producers

Impacts

Improved Agriculture Sustainability
- Increased profitability at farm gate

Improved Environmental Stewardship
- Research farm is model for producers to follow

Strategic Framework
November 2003

SOUTH EAST RESEARCH FARM INC.

Redvers, SK

Mission Statement:

"to provide quality applied research and demonstrations that are producer- driven with results extending to and beyond the farmgate to improve agricultural sustainability and encourage environmental stewardship."

History:

- Originally called "Redvers Research & Demonstration Project", it began in 1997.
- Began as part of the SPOKE program under the Special Crop Area of Agri-Food Innovation Fund and was managed by South East Prairie Rural Development Co-op Ltd.
- Moved to its present land location (NW5-7-31-W1) in 2000.
- Producer Advisory Committee began in 2000.
- South East Research Farm Inc. – not for profit Producer Corporation registered in 2001.
- Formation of Agri-ARM – Provincial organization to coordinate applied research and demonstration activities began by Agri-Food Innovation Fund.
- Transition from AFIF to Agri-ARM occurred on April 1, 2002.
- Transition from SEPRDC Ltd. to South East Research Farm Inc. in spring of 2002.

Benefits of Membership:

- As a member you will have the opportunity to contribute to the direction of applied crop research & demonstration in SK.
- As a member, you will also have the opportunity to provide input for the development of research projects that are relative to local soils, climate, and growing pressures.
- Members will receive periodic communications and newsletters which will keep them informed regarding research at the farm.
- Members may receive reduced rates or free admissions to events sponsored by the South East Research Farm Inc.
- As a member, you can help determine other benefits of membership by sitting on the Board of Directors.

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